Forest Watcher App implementation to design protected area patroling system in Beampingaratsy forest corridor (South-eastern Madagascar)

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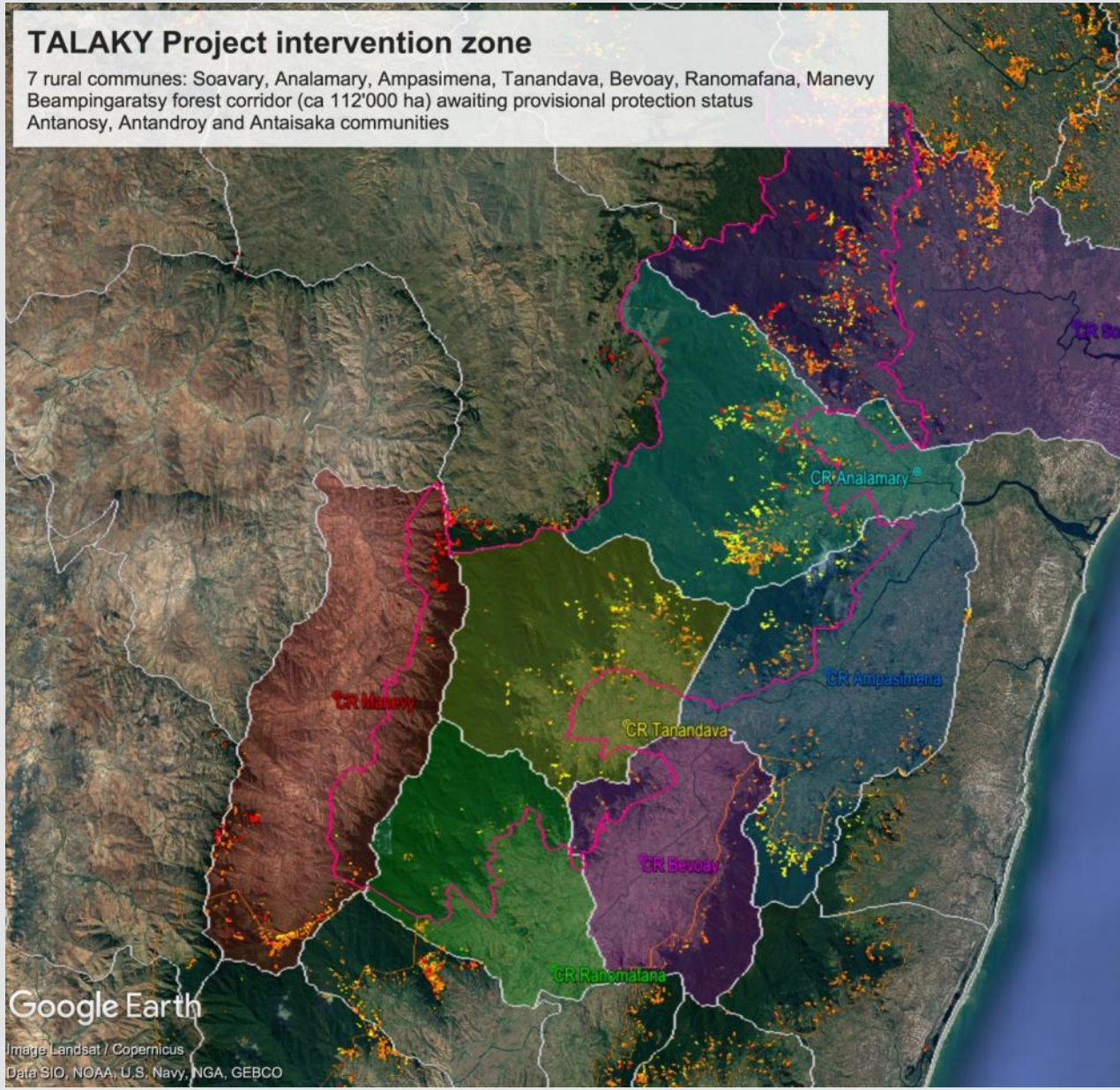
Antananarivo, 01/08/2019

Introduction

Beampingaratsy forest corridor is awaiting provisional protected area status (NAP) following the protected area promoter (Association Nitidæ) demand as part of the **TALAKY project program**.

In respect to the Protected Area Law (COAP), the promoter must establish efficient patroling system to detect and monitor pressures on habitats and biodiversity. Such a system is necessary to document these pressures for further law enforcement operations with regional Environment & Forests Direction authorities.

Initially, Nitidæ planned to use smartphone-based application (SMART, CyberTracker) for monitoring forest patrols guided by VIIRS alerts (fires) reports and by drone surveys (deforestation) during tavy tree-cutting season (slash-and-burn cultivation also known as tetiky in this area).



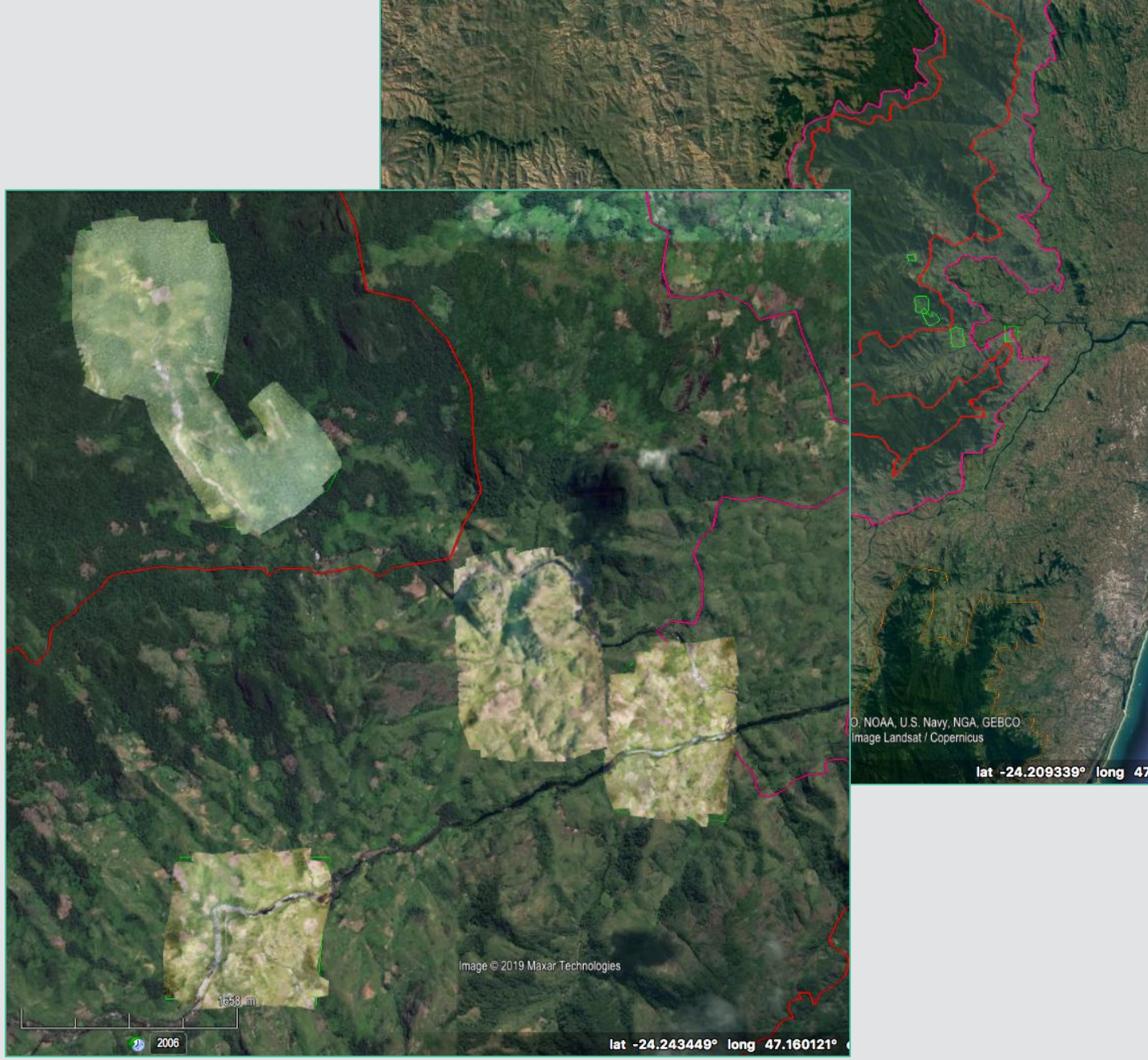
Background

In November 2018, a drone-test mission produced 4-cm resolution imagery covering 900 ha, clearly showing deforested areas.

Owing to practical constraints (access, power, meteo, costs), it appears that the drone system wouldn't be appopriate to cover all the areas potentially subject to tetika during the 2/3-month-long tree-cutting season.

Forest Watcher was also tested in November 2018 to check GLAD/VIIRS alerts (fires) delivered daily directly on the application; CyberTracker and SMART applications were also tested with less success and technical issues with different smartphones models.

Forest Watcher was selected for forest patrolling in Beampingaratsy area.



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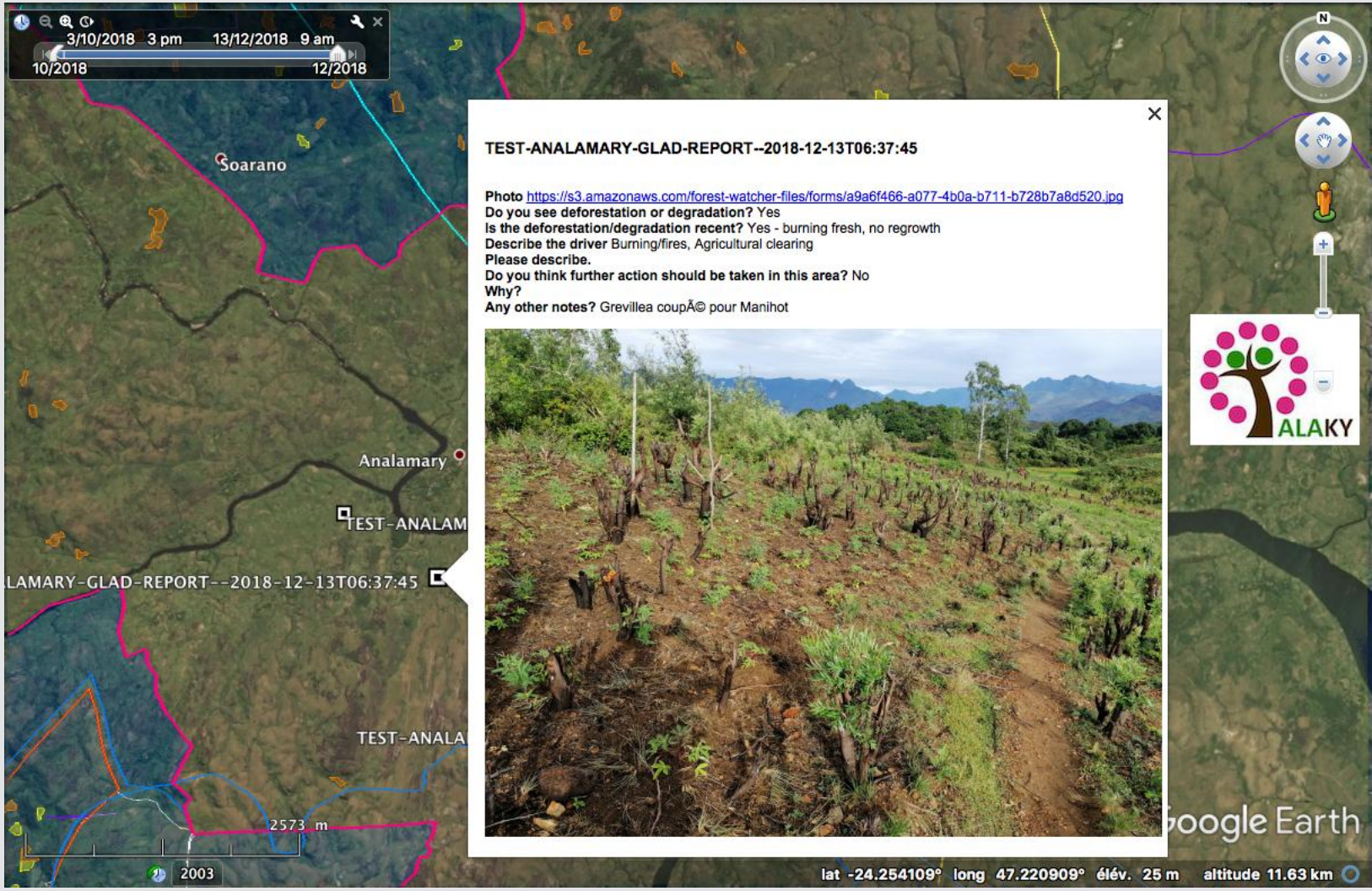
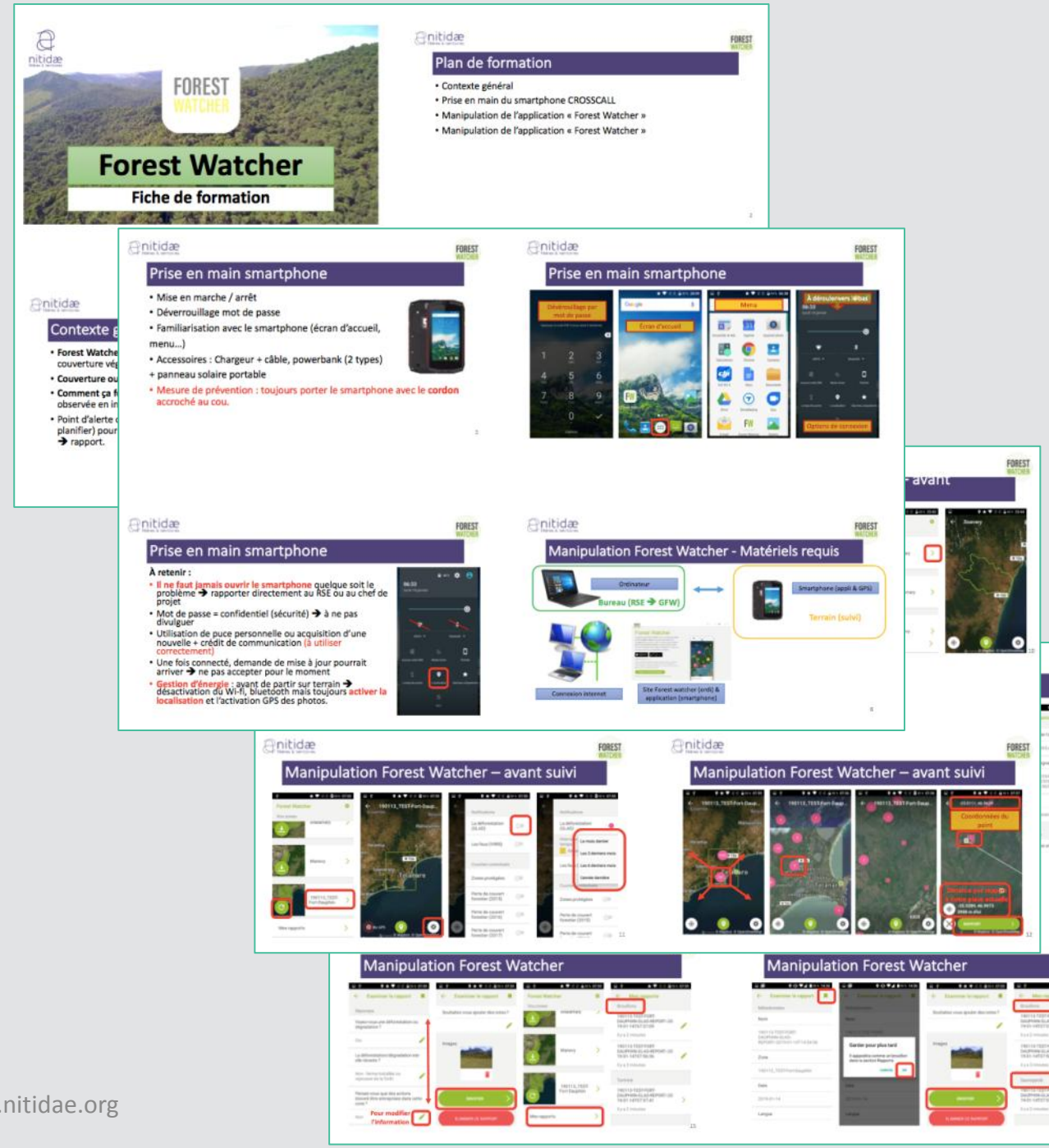


Approach

In November 2018 that Global Forest Watch began to deliver GLAD alerts on a 8-days basis for whole Madagascar; a preliminary mission was organized in December to check 1) the accuracy/confidence of GLAD alerts and 2) practability of the ForestWatcher application.

Based on preliminary but successful results, it was decided to launch and deploy ForestWatcher application amongst the 7 Forest & Co-management Technicians (TFC) team.

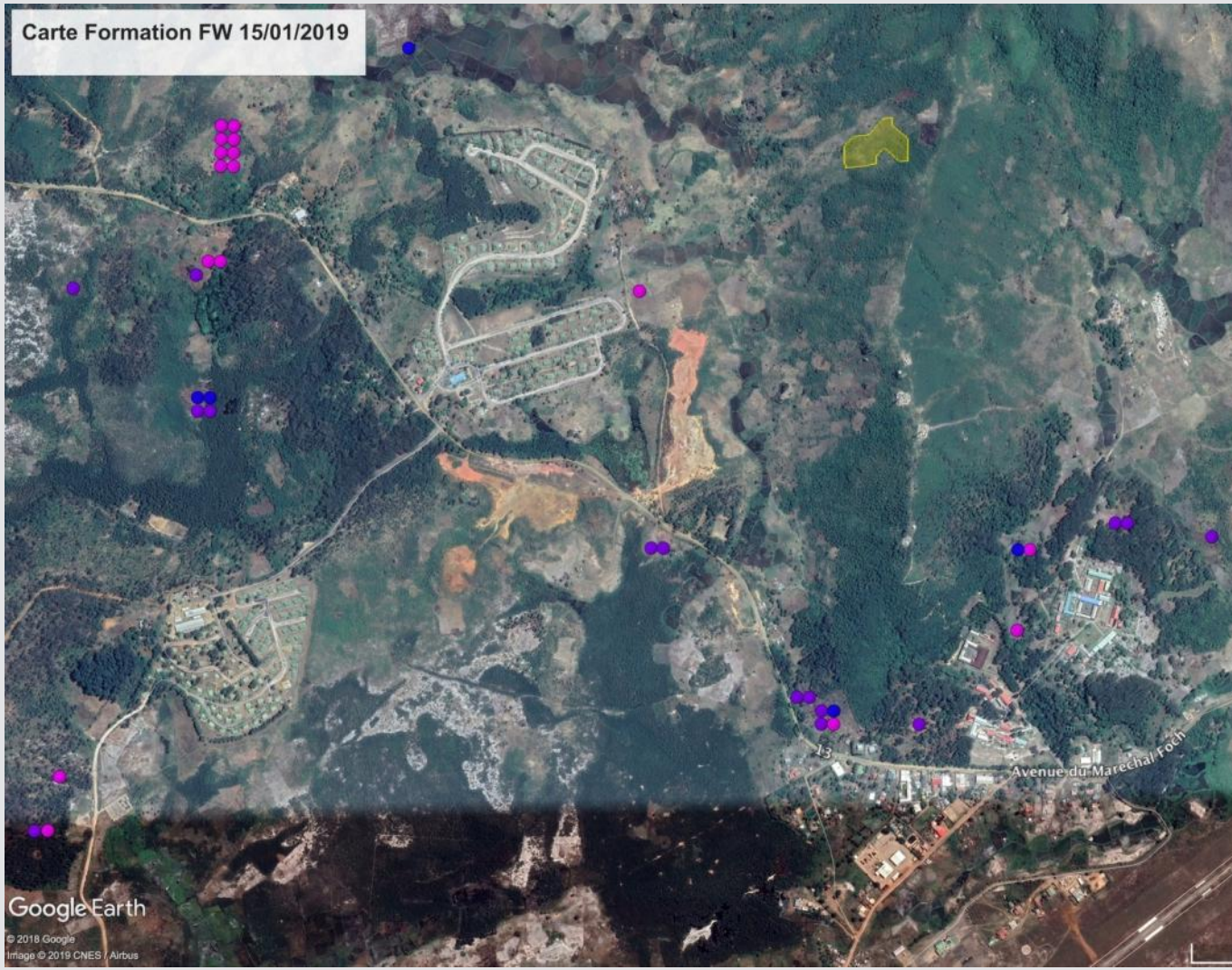
According to the time generally needed to settle monitoring system amongst recently established team, it was necessary to reserve a 6 months' testing period before the begininng of high-risk season (fires season extands from July to December and tree-cutting season from October to December).



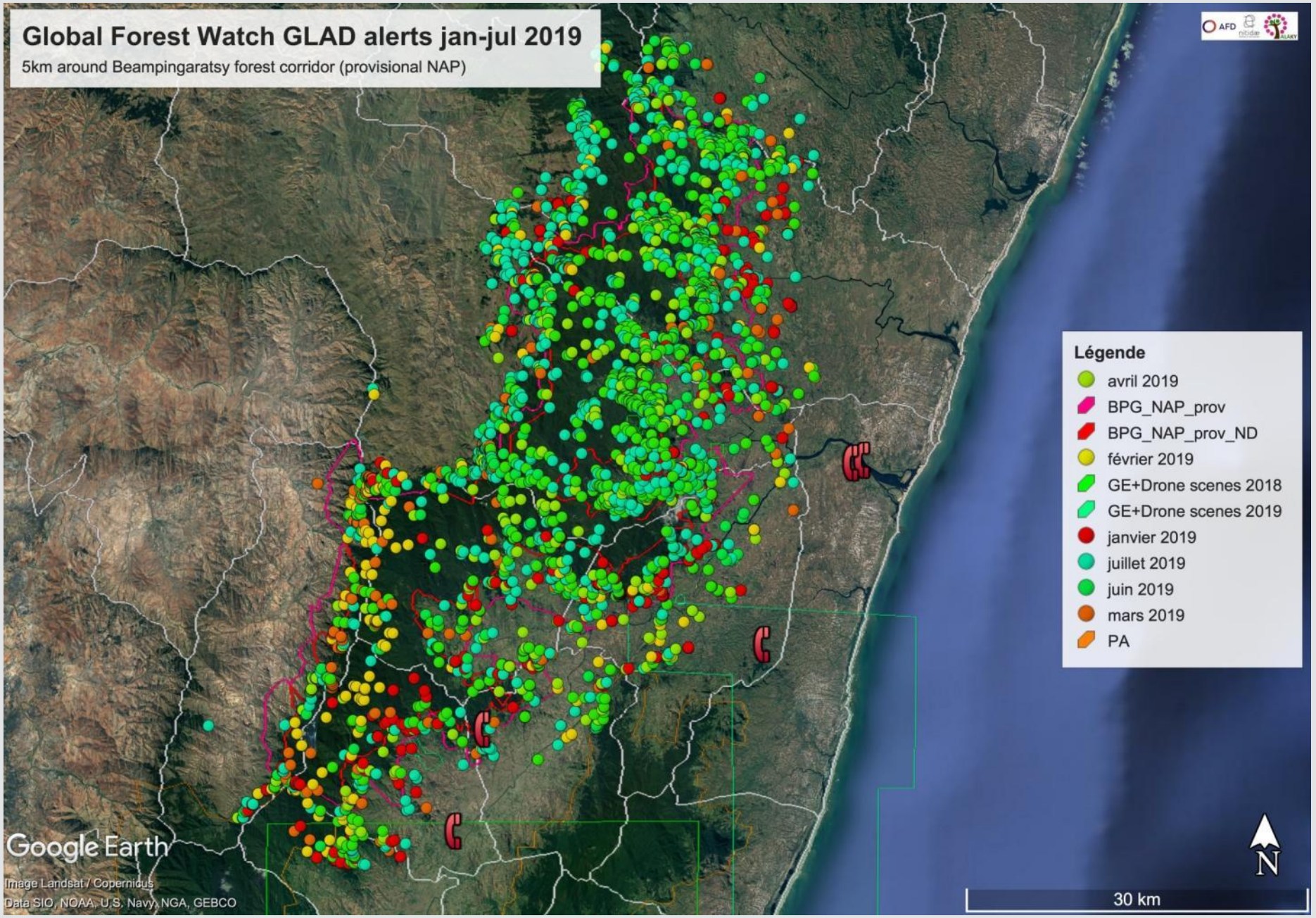
Tools

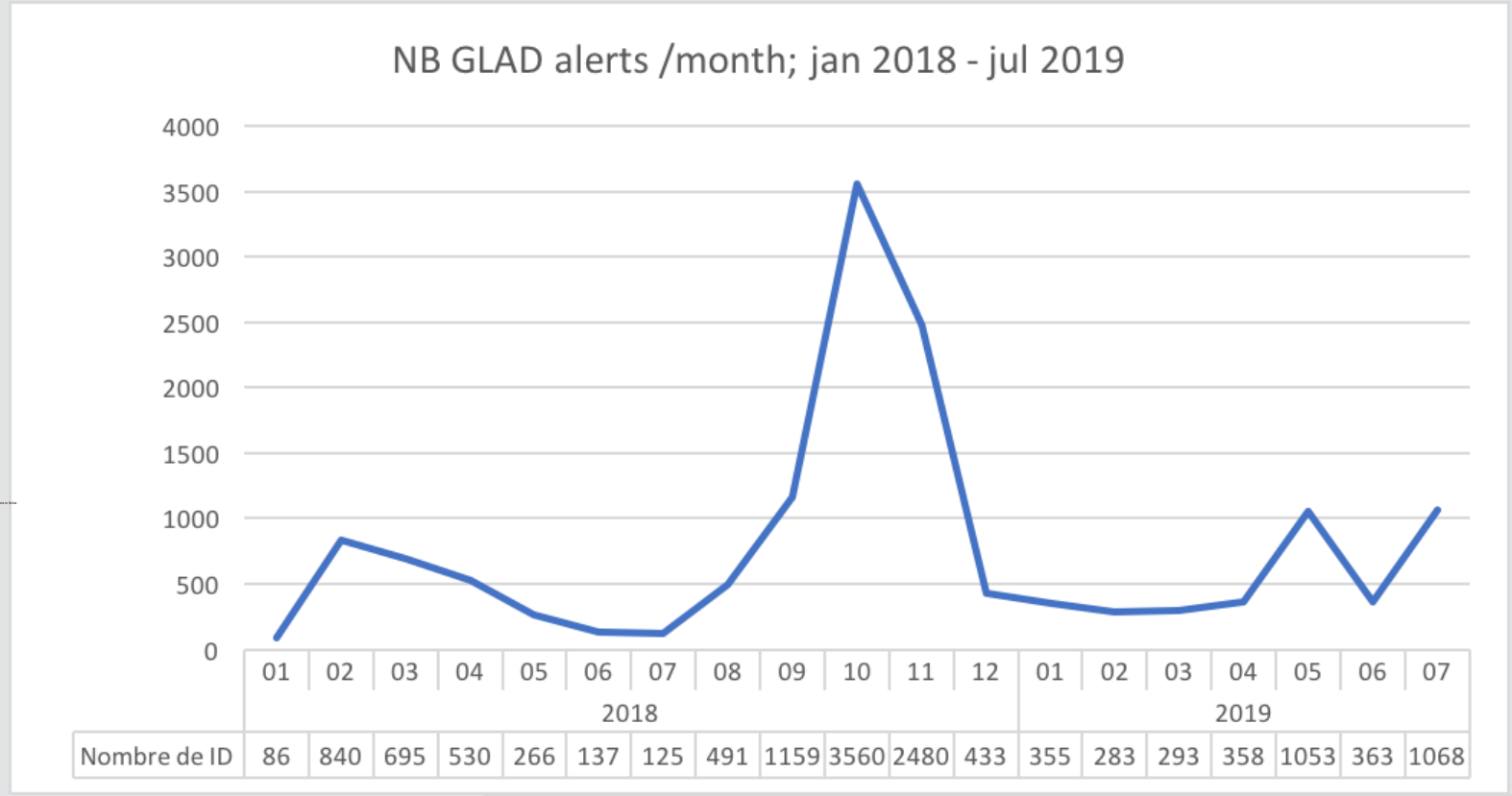
CROSSCALL Trekker M1 smartphones were selected for their water/chock resistance. Team were trained to smartphones use and to ForestWatcher application; **practical training was organized around Taolagnaro city**. In order to avoid zone of interest unintentional removal, 7 distinct FW accounts were created for each municipality assigned to technician. Knowing network access constraints, monthly alerts were uploaded on FW application before technicians return to their operational basis.

After 2-months testing, patrols were re-planned based on preliminary results to adapt to the main identified constraints. The patrolling framework was designed to focus on natural forests areas, conservation-oriented and restoration zones; patrolling frequency was designed to tackle specific high frequency periods and week days.



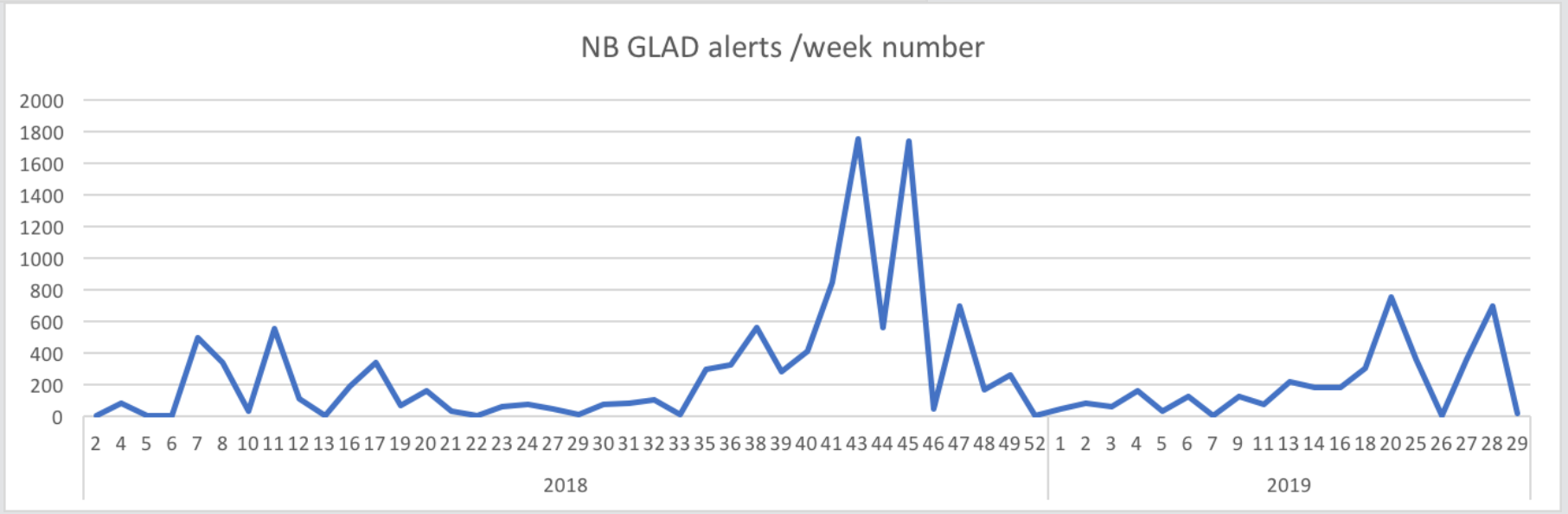
GLAD alerts accuracy



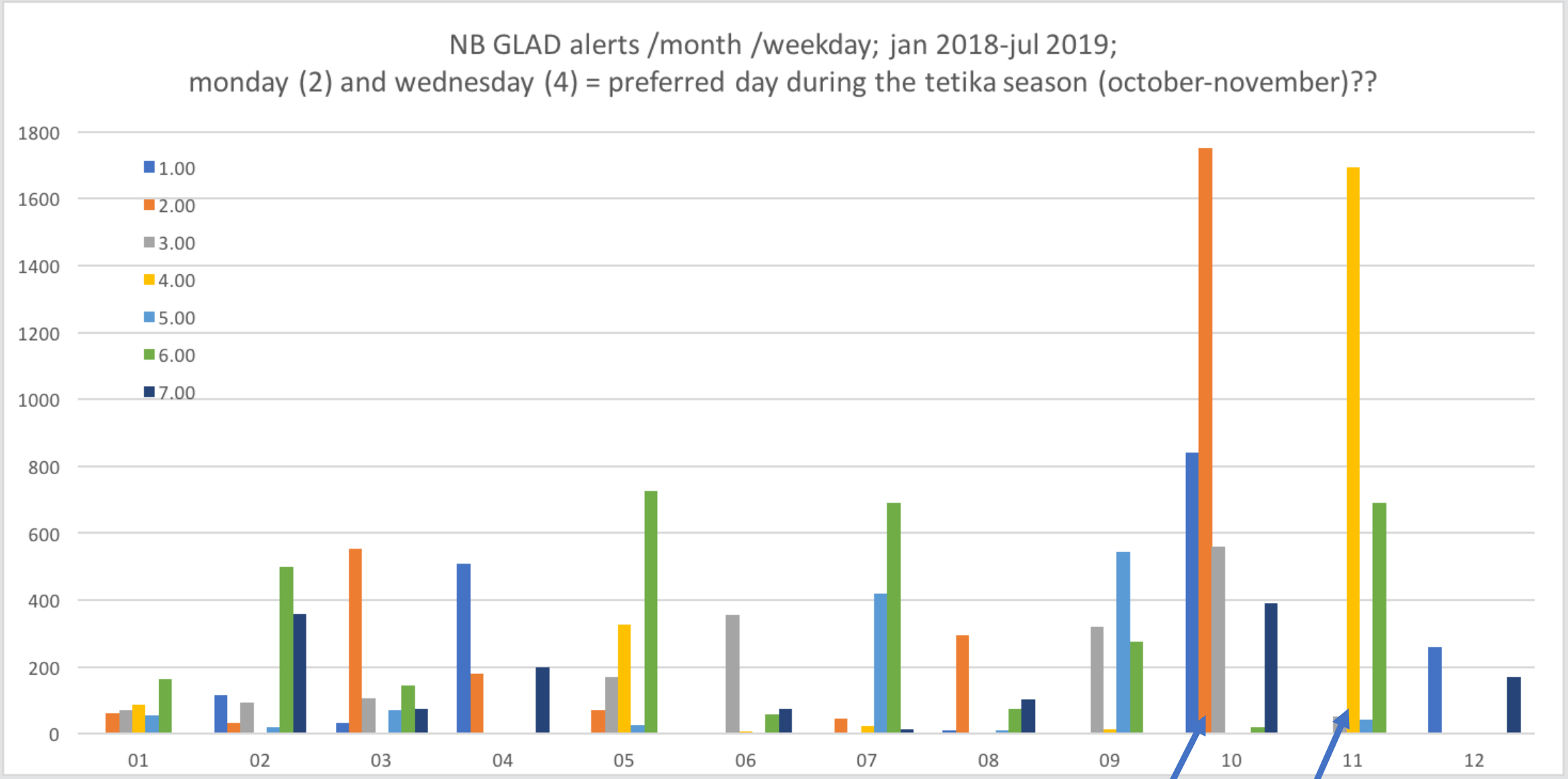


GLAD alerts display a peak in october-november corresponding to tetika season (clear-cutting for rain-fed rice)

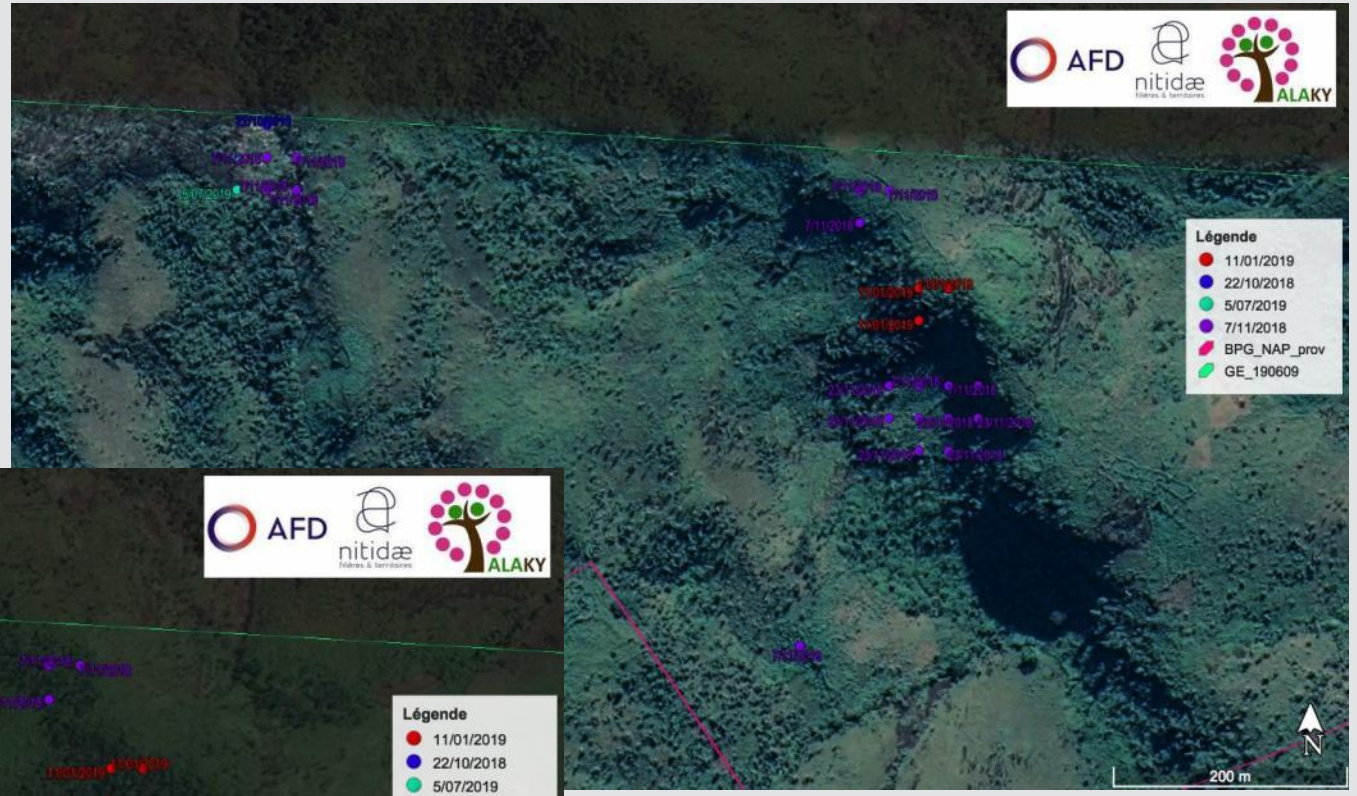
No GLAD alerts prior to 2018 (proposed on GFW): difficult to compare actual VS trends historical trends

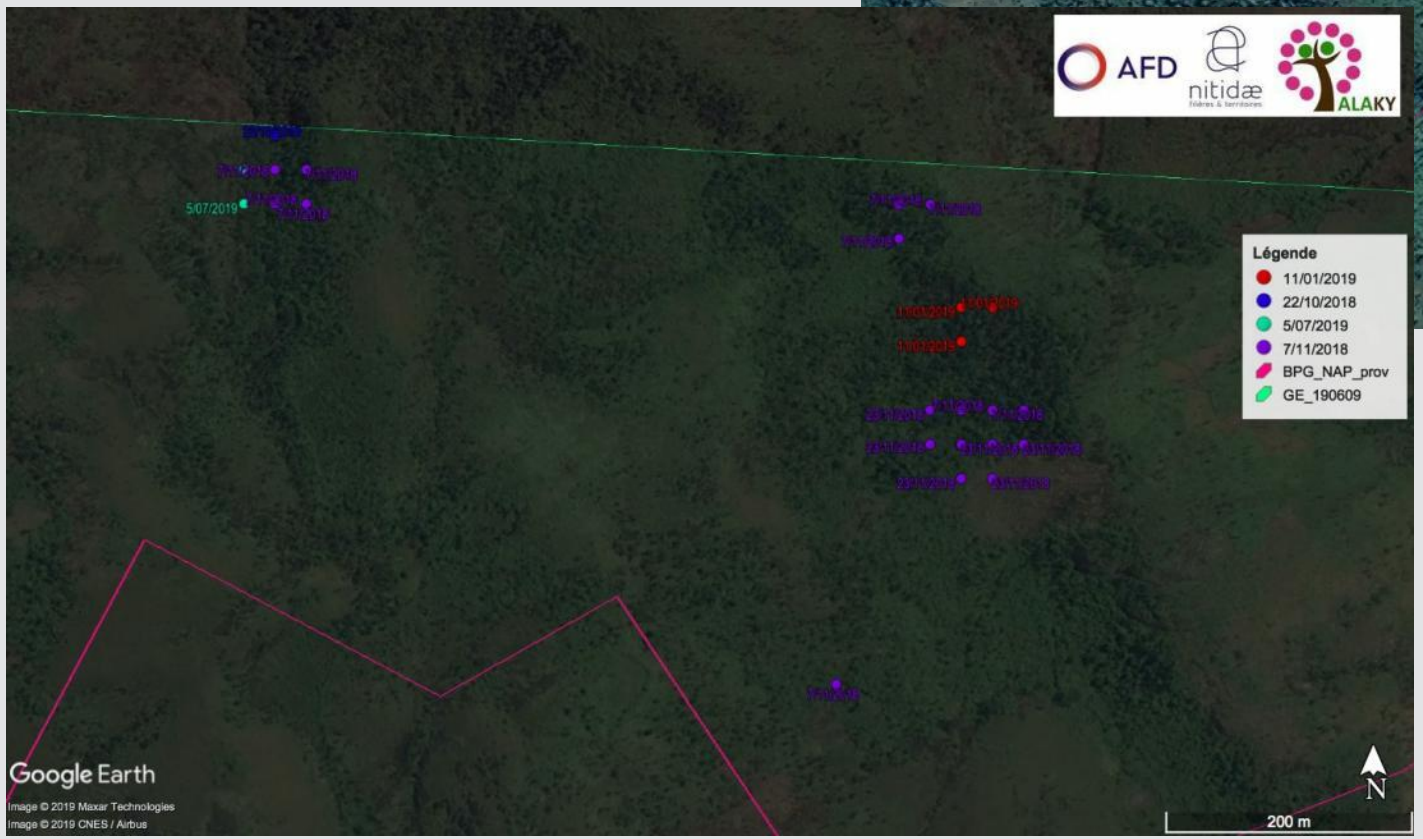


GLAD alerts per weekday:



GLAD alerts confirmed by recent Google Earth imagery





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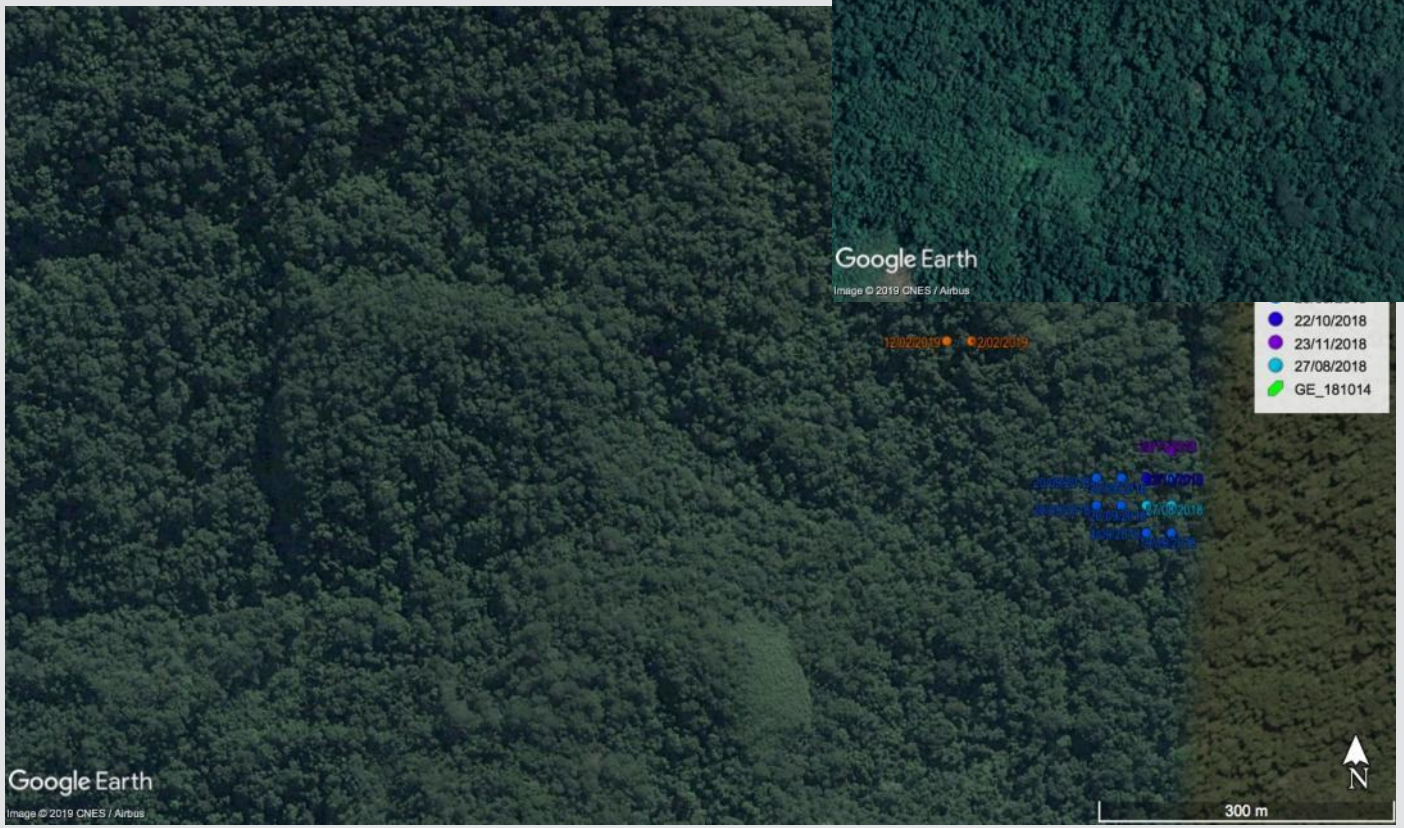

Some recently deforested areas without GLAD alerts

MONGABAY

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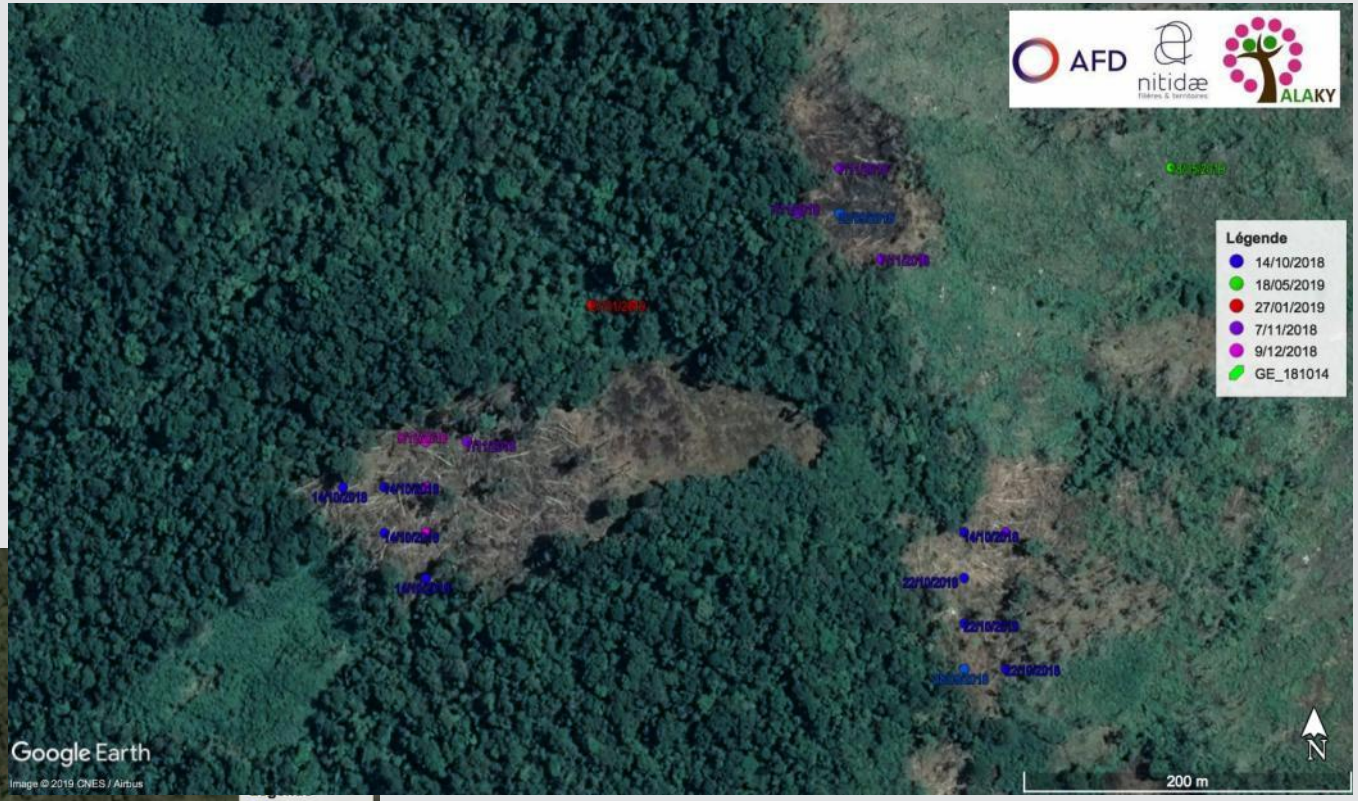
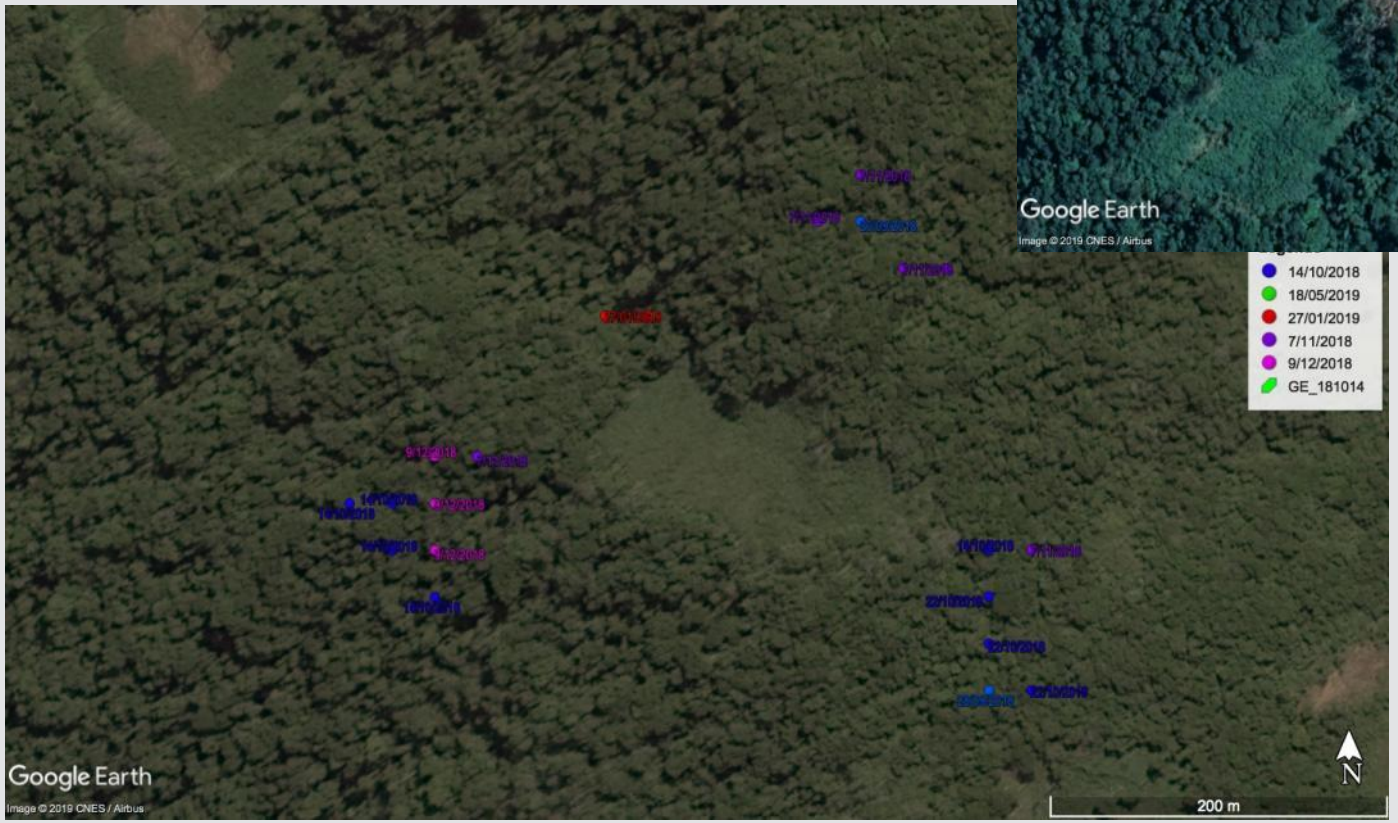
GLAD alerts confirmed by recent Google Earth imagery:

- Forest clear-cutting
- Secondary regrowth clearing





GLAD alerts dates reflect tree-cutting/clearing sequence (2-3 weeks)

GLAD alerts confirmed by recent Drone surveys

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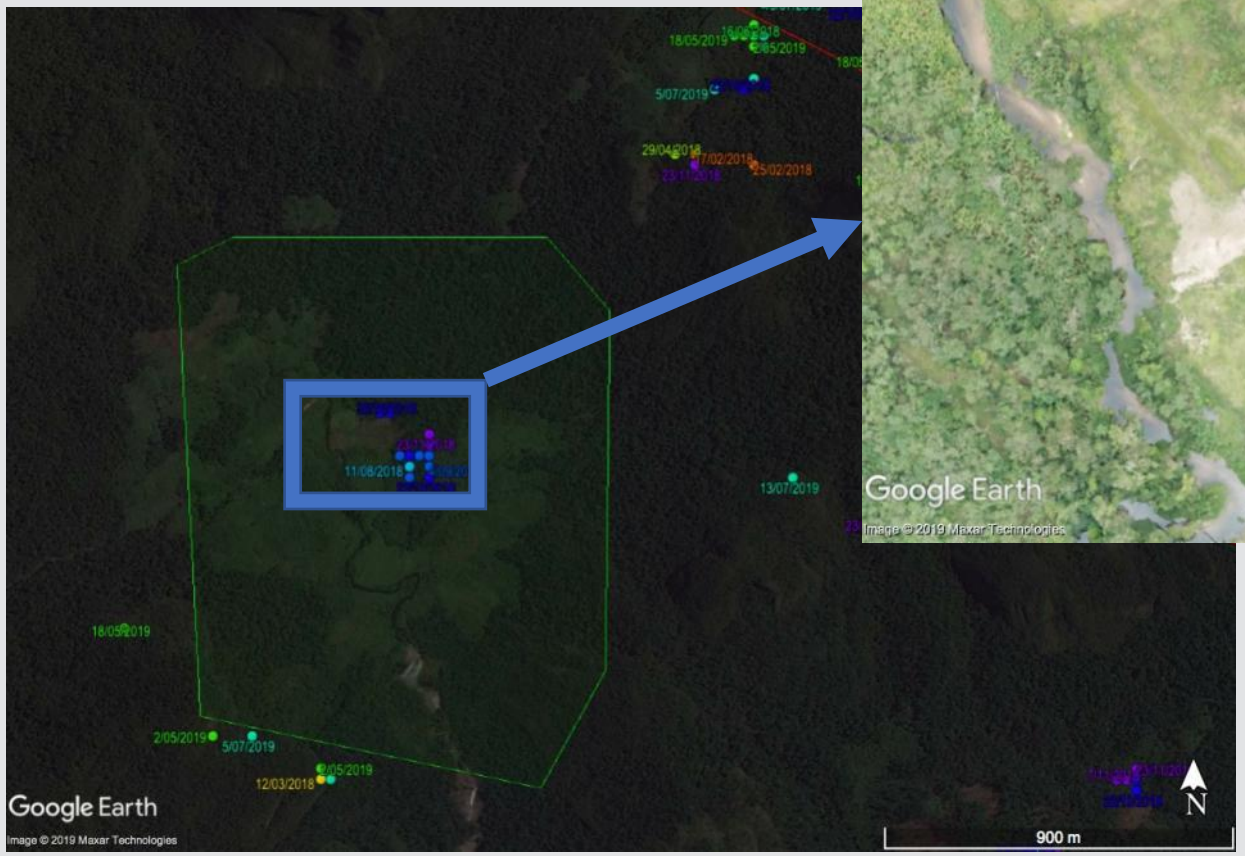
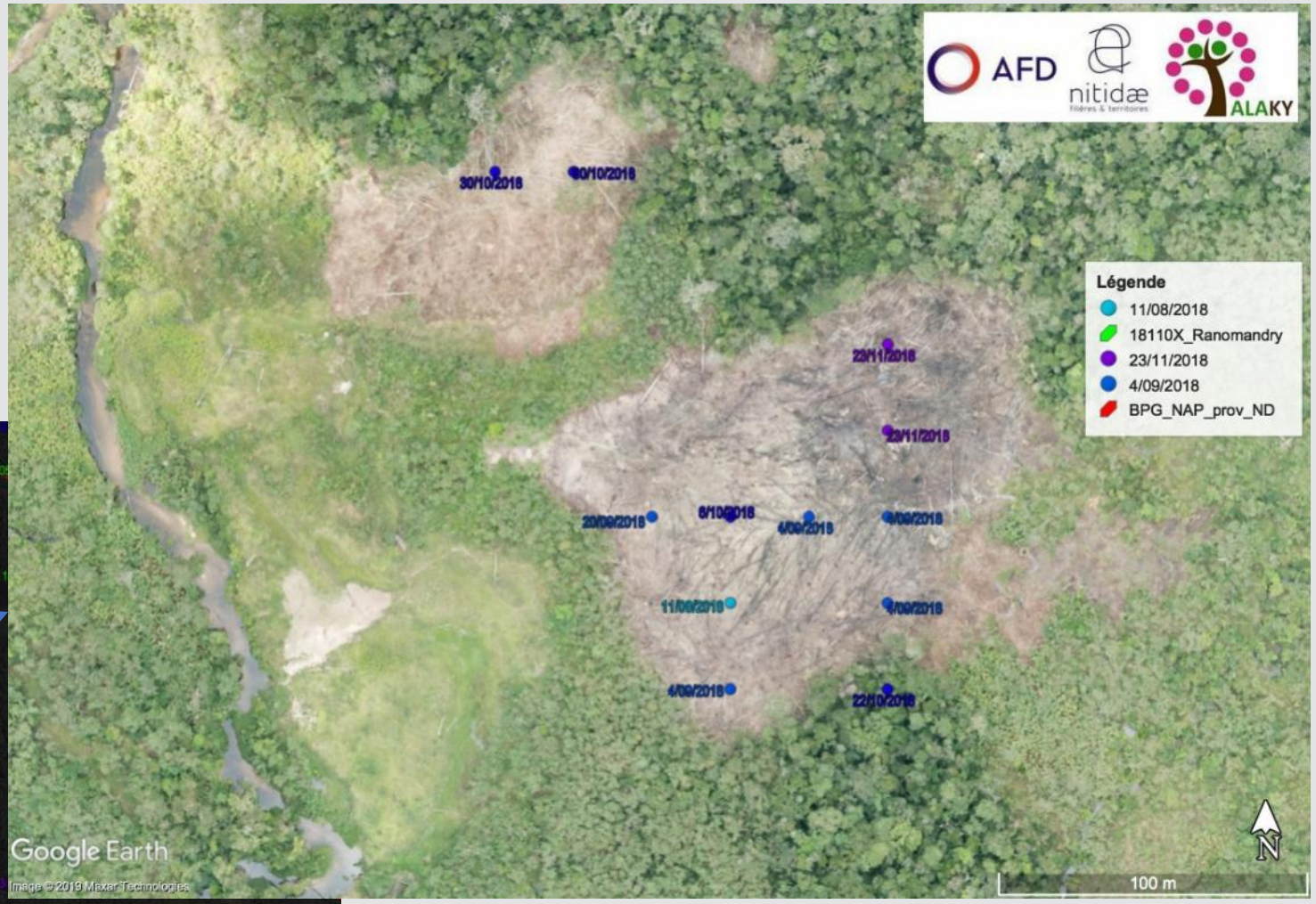
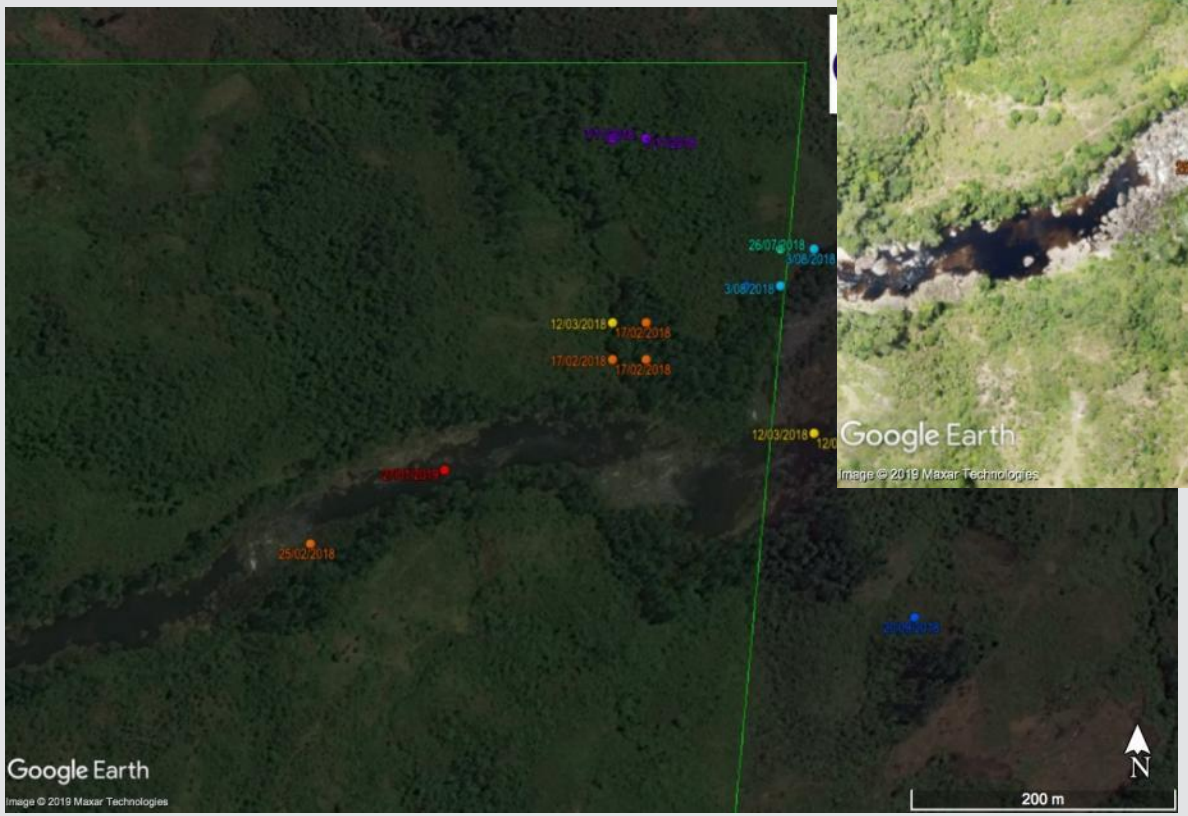
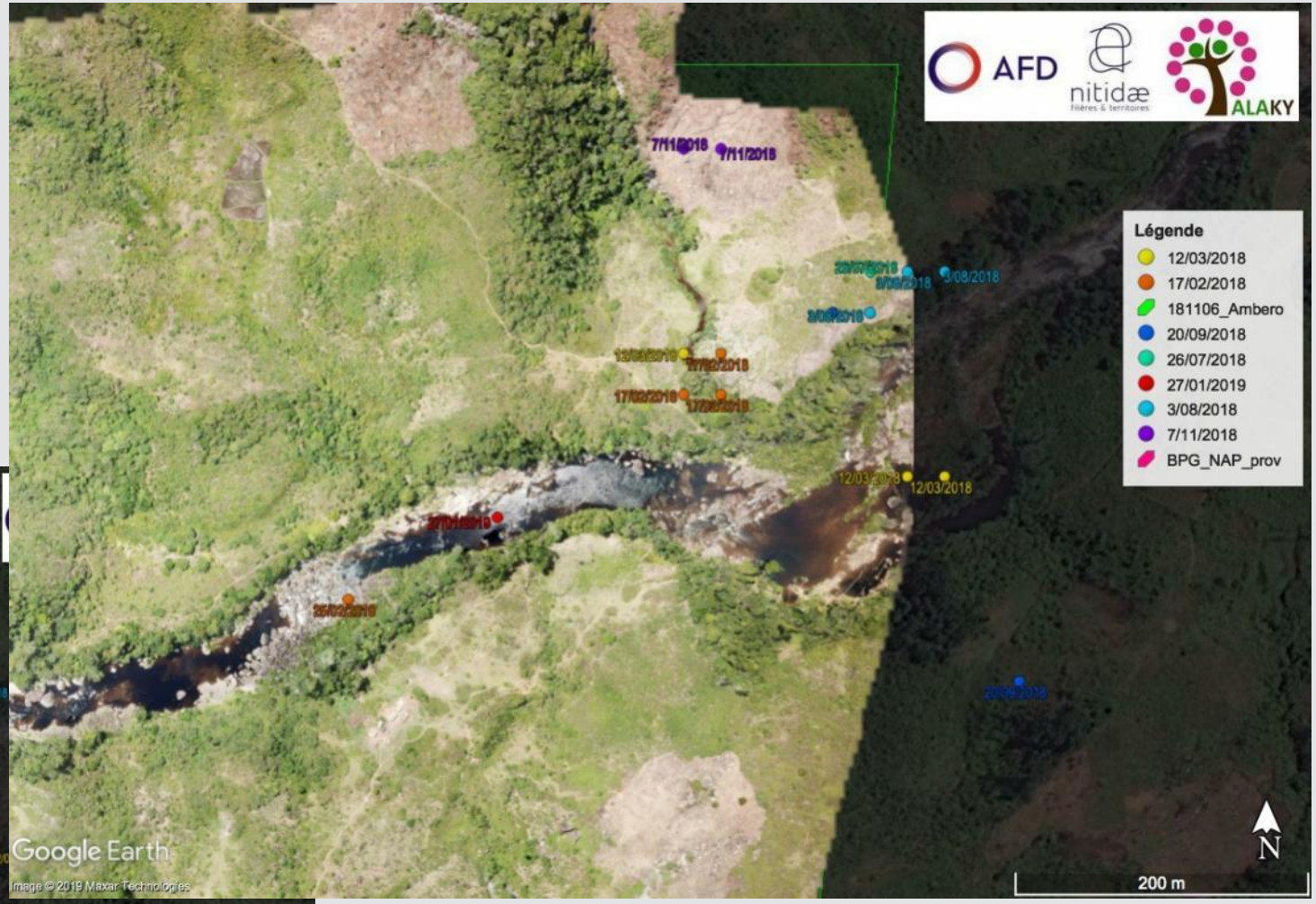




Superposed to appropriate forest layer, GLAD alerts might be used to estimate deforestation for operational purpose

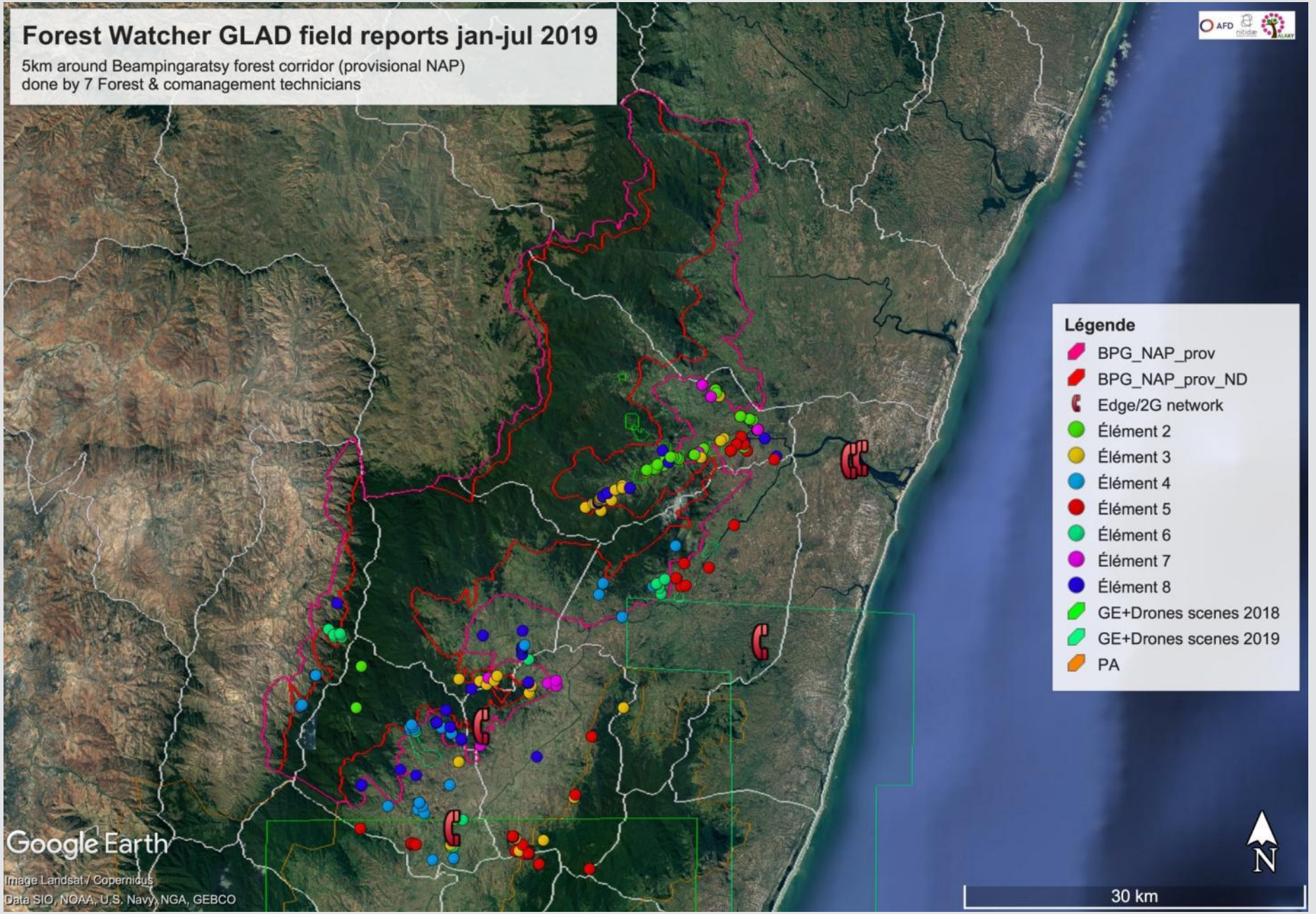
GLAD alerts confirmed by recent Drone surveys



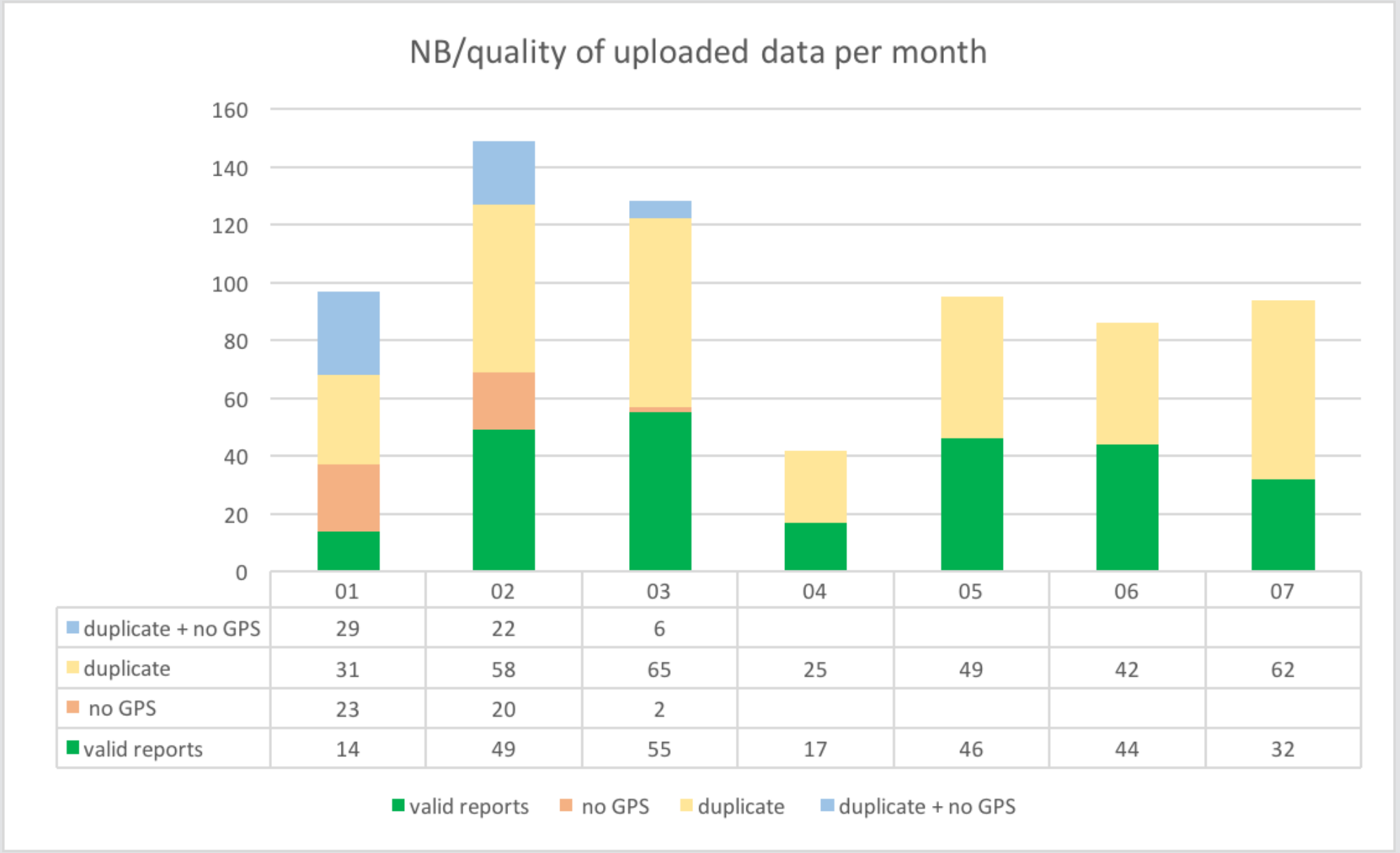


Drone surveys reveal false signals: mostly on rocky outcrops or along rivers (might be riverine vegetation cover removal after flooding)

Forest Watcher GLAD reports: 253 reports in 2019 (January-July)



Forest Watcher GLAD reports: Many duplicates!



	01	02	03	04	05	06	07
duplicate + no GPS	29	22	6				
duplicate	31	58	65	25	49	42	62
no GPS	23	20	2				
valid reports	14	49	55	17	46	44	32

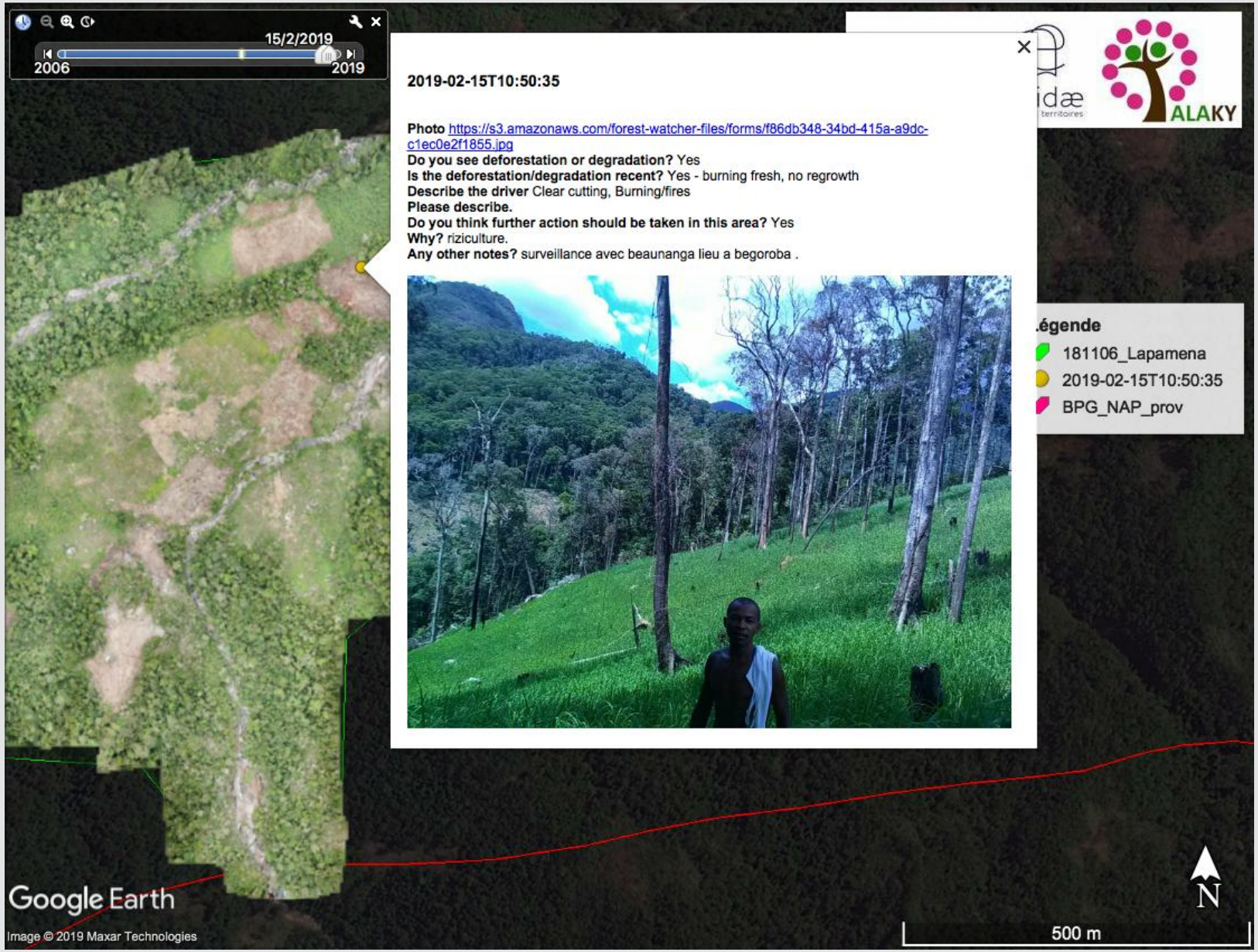
GLAD alerts confirmed by field patrols using FW application and by GE imagery

April2016

Nov 2018

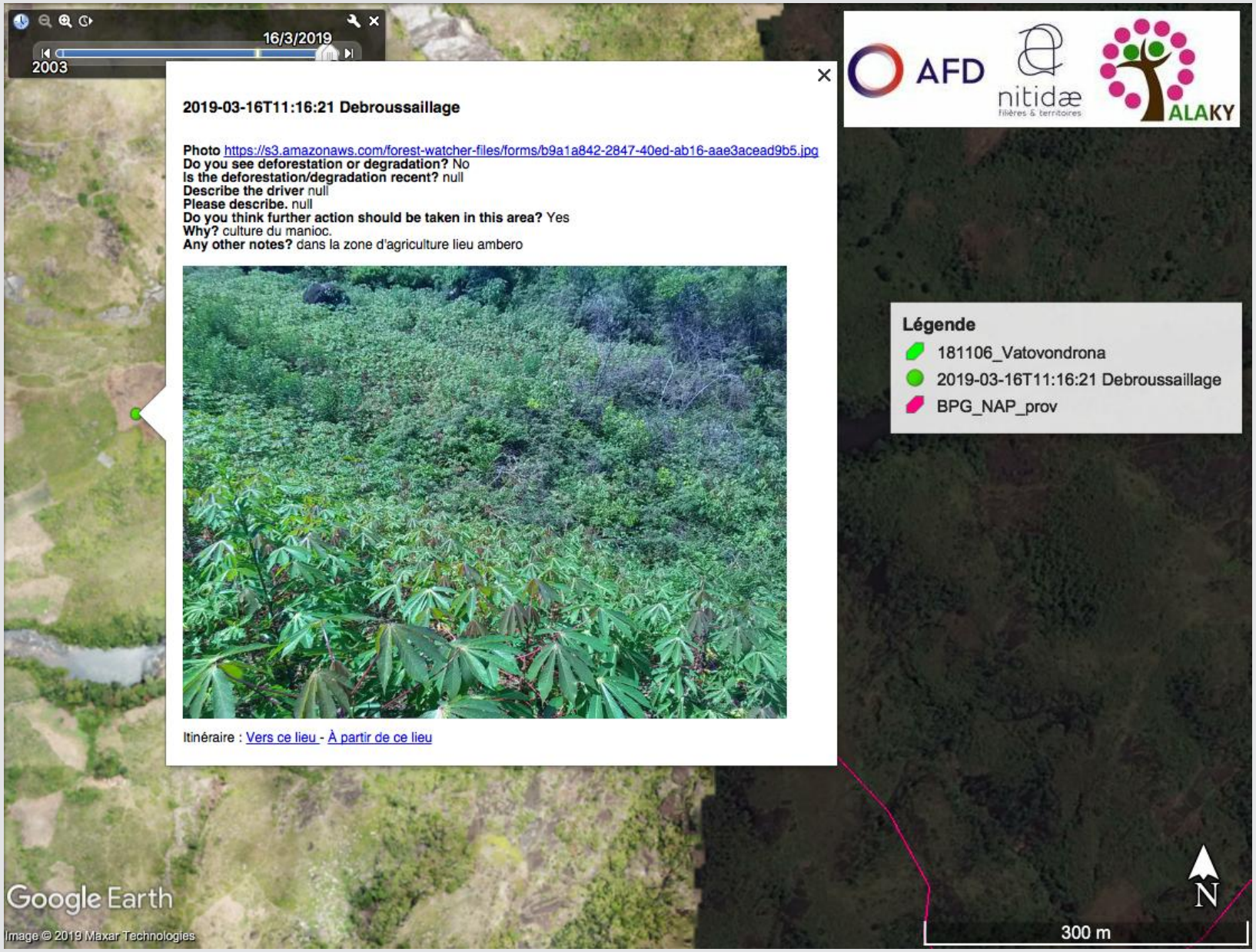
GLAD alerts confirmed by field patrols using FW application and Drone surveys

GLAD alerts also detect edge forest degradation following slash-and-burn or burning (here for tetika = rainfed rice cultivation in buffer zone)



GLAD alerts confirmed by field patrols using FW application and Drone surveys

GLAD alerts detect also low secondary regrowth clearing+burning (here for cassava rainfed cultivation in the buffer zone)



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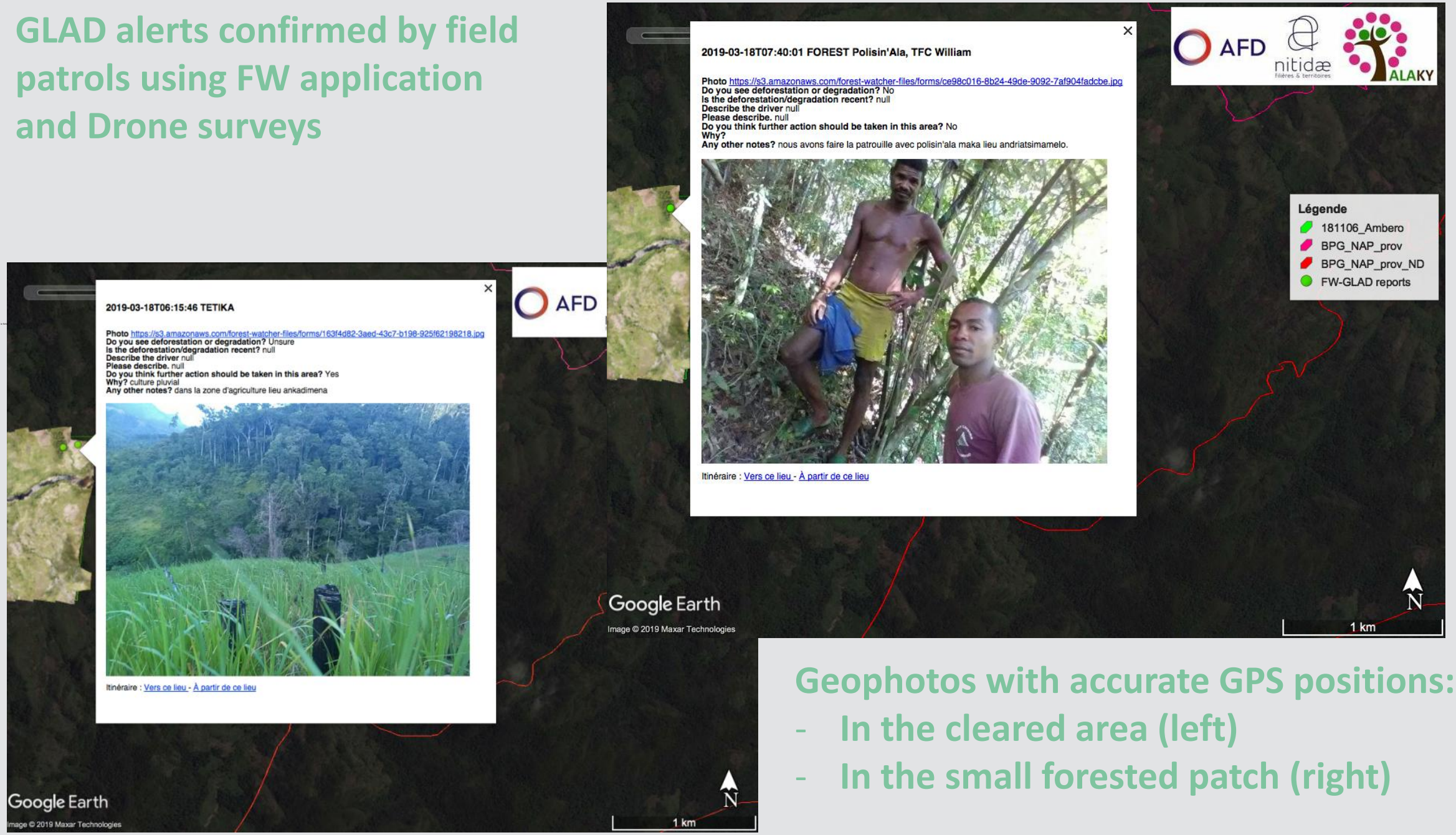
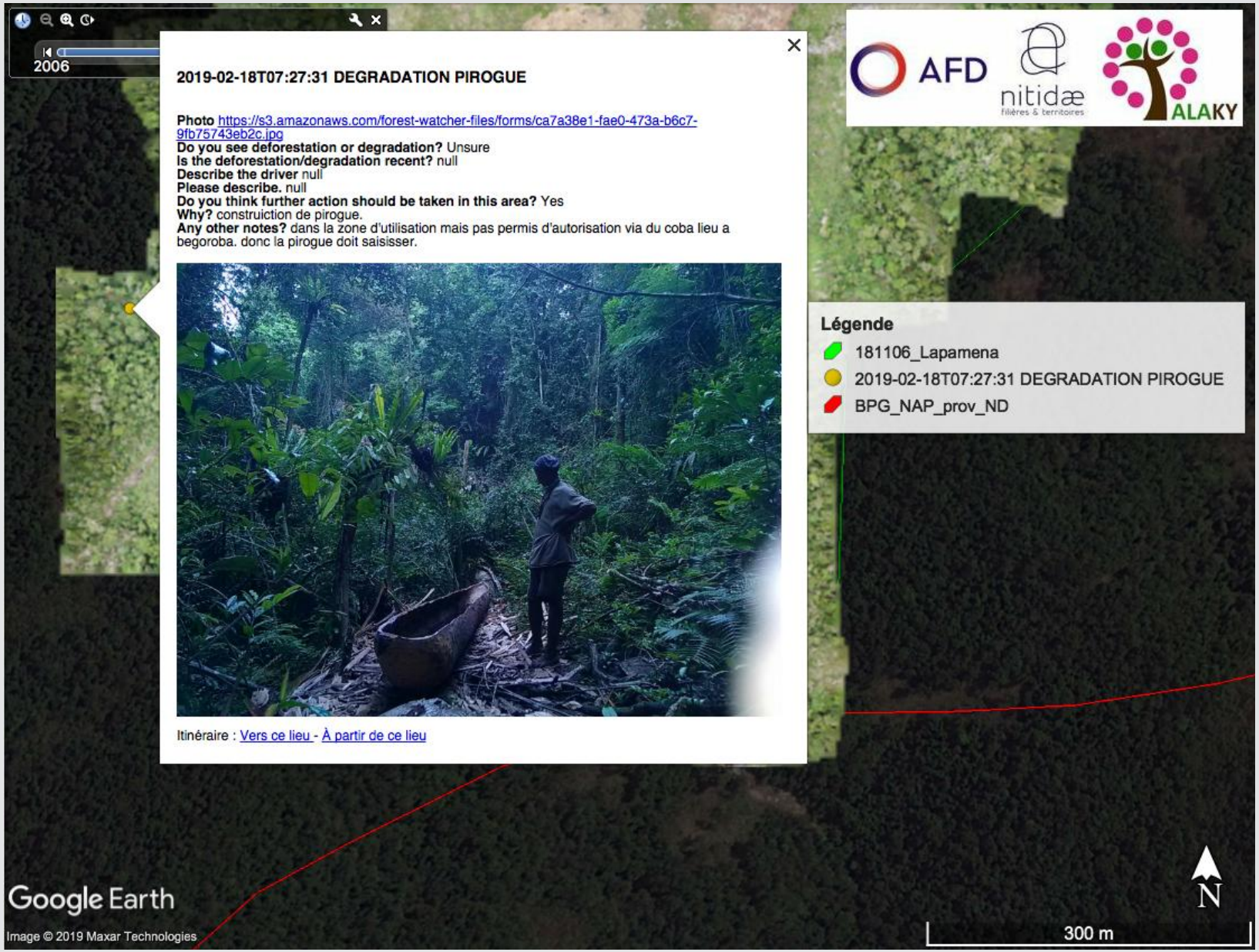


Geophotos with accurate GPS positions:

- In the cleared area (left)
- In the small forested patch (right)

GLAD alerts confirmed by field patrols using FW application and Drone surveys

GLAD alerts sometimes detect also forest degradation: isolated tall tree cutting for pirogue construction in the conservation zone



Discussions & Conclusions

Main constraints:

- Network access (Edge/2G network **not sufficient for alerts download, impossible for reports upload**)
- Smartphone first uses (parameters, tactile screen,…)
- Accounts management (needs different user/zone account to avoid unxpected data supression)
- **FW app unstable** (**loss of previously collected reports when upgrading! even when relaunching/disconnecting app)**
- Navigation on FW app toward GLAD alerts location (**no detailed imagery without connection**, no compass)
- Already checked alerts not marked differently
- Administrative or PA limits (buffer, core zone) not visible on the FW app, despite uploaded on the Desktop version
- No tracks recorded (maybe better)
- No easy data analysis/reports platform on FW desktop version
- No master account for different zones/users

Needed improvements:

- Complementay training
- Make detailled imagery available
- Display needed limits, administrative, PA/TGRN zoning, habitats
- Mark alerts in forest areas (>70% cover) differently
- Option to upload only reports data (but not photos)
- Improve multi-users/zones management on Desktop version
- Improve automatic reports on regular period

Discussions & Conclusions

Further development in Beampingaratsy:

- GLAD alerts used to target project beneficiaries around villages, not only illegal deforestation in the conservation area
- Detailed documented reports for enforcement actions (coordinates, photographs, areas, trees cut, …)
- Explained case studies for outreach and education actions
- FW app used to monitor forest transfer association meetings and activities in the different zones

Detailed assessment:

- Alerts
- Navigation
- Photo
- Questionary

Indicators developped to monitor system use:

- GFW alerts trends to monitor habitats pressures (fires, vegetation loss)
- FW reports & patrolling efficicency (% of alerts verified by zones, patrolling effort by zone)

System acceptance amongst stakeholders:

- Regional technical administrative services: DRAE, DREF
- Decentralized territorial bodies: Region, Municipalities
- Associations responsible for forests management (COBA)
- Other local communities

Thank you – Merci - Misaotra

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